

JAN 11 2005

Amendments to the Claims:

This listing of claims will replace all prior versions, and listing, of claims in the application:

Listing of the Claims:

1. (Currently Amended) ~~In a Java computing environment,~~ **A computer readable medium including computer program code for an** ~~Java object representation~~ **inside a virtual machine and** ~~suitable for use by a said Java virtual machine, said a Java object representation~~ **said computer readable medium** comprising:

 computer program code for a first reference to an internal class representation **inside said virtual machine, wherein said internal class representation is associated with** of said Java object, **and wherein said first reference can be used to invoke one more methods associated with said object;** and

 computer program code for a second reference to instance fields **of** ~~associated~~ with said Java object **which is represented by said object representation inside said virtual machine, wherein said second reference can be used to access one or more instance fields of said Java object at runtime ;** and

 ~~wherein said first reference is a direct reference to said internal class representation of said Java object.~~
2. (Currently Amended) **A computer readable medium** ~~Java object representation as recited in claim 1,~~

 wherein said second reference is a reference to an array of references, and

 wherein each reference in said array of references is a reference to an instance field associated with said Java object.
3. (Currently Amended) **A computer readable medium** ~~Java object representation as recited in claim 1,~~ wherein said first reference is allocated as four bytes.

4. (Currently Amended) A computer readable medium Java object representation as recited in claim 1, wherein said second reference is allocated as four bytes.

5. (Currently Amended) A computer readable medium Java object representation as recited in claim 1,

wherein said internal class representation includes a header of a predetermined size, and

wherein a method table associated with said Java object is allocated immediately after said header.

6. (Currently Amended) A computer readable medium Java object representation as recited in claim 1, wherein said computer readable medium Java object representation further comprises:

computer program code for a hash key that can be used to identify the Java object.

7. (Currently Amended) A computer readable medium Java object representation as recited in claim 6, wherein said hash key is the memory address of said first reference.

8. (Currently Amended) A method for representing a Java object in a virtual machine, said method comprising:

allocating a first reference in a memory portion of said virtual machine, wherein said first reference is a reference to an internal class representation of said Java object, wherein said first reference can be used to invoke one more methods associated with said object at runtime;

allocating a second reference in a memory portion of said virtual machine, wherein said second reference is a reference to instance fields associated with said

Java object, and wherein said second reference can be used to access one or more instance fields of said object at runtime; and

wherein said first reference is a direct reference to said internal class representation of said Java object.

9. (Original) A method as recited in claim 8,
wherein said second reference is a reference to an array of references, and
wherein each reference in said array of references is a reference to an instance field associated with said Java object.
10. (Original) A method as recited in claim 9, wherein said first reference is allocated as four bytes.
11. (Original) A method as recited in claim 9, wherein said second reference is allocated as four bytes.
12. (Original) A method as recited in claim 9,
wherein said internal class representation includes a header of a predetermined size, and
wherein a method table associated with said Java object is allocated immediately after said header.
13. (Original) A method as recited in claim 9, wherein Java object representation further comprises:
storing a hash key that represents the object.
14. (Original) A method as recited in claim 9, wherein said hash key is the memory address of said first reference.

15. (Currently Amended) A method of accessing information regarding an Java object which has been represented in an internal object representation inside a virtual machine, said method comprising:

identifying an internal object representation associated with for said Java object inside said virtual machine;

determining whether a method associated with said object should be invoked or an instance field associated with said object should be accessed;

using a first reference in said internal object representation to locate an appropriate internal class representation inside said virtual machine when said determining determines that a method should be invoked, wherein said internal class representation is associated with said Java object and can be used to invoke one more methods associated with said object; and

using a second reference in said internal object representation to locate one or more instance fields of said object when said determining determines that an instance field should be accessed, wherein said second reference can be used to directly access said one or more instance fields of said Java object.

~~accessing information regarding said Java object from said internal class representation; and~~

~~wherein said object is represented in a Java virtual machine.~~

16. (Original) A method as recited in claim 15, wherein said method further comprises:

skipping a header of said internal class representation to access a method table associated with said Java object.

17. (Original) A method as recited in claim 15, wherein said information regarding said Java object includes a field descriptor table.

18-20. (Cancelled).

21. (New) A virtual machine, wherein said virtual machine is capable of:

identifying at runtime an internal object representation for an object inside said virtual machine, wherein said internal object representation includes a first and a second reference which respectively reference an internal class representation and one or more instance fields associated with said object;

determining at runtime whether a method associated with said object should be invoked or an instance field associated with said object should be accessed;

invoking a method at runtime, using a first reference in said internal object representation, to locate an appropriate internal class representation inside said virtual machine when said determining determines that a method should be invoked, wherein said internal class representation can be used to locate one more methods associated with said object; and

accessing one or more instance fields at runtime, using a second reference in said internal object representation, to locate one or more instance fields of said object when said determining determines that an instance field should be accessed, wherein said second reference can be used to directly access said one or more instance fields of said object at runtime.

22. (New) A virtual machine as recited in claim 21, wherein said virtual machine is a Java™ compliant virtual machine.

23. (New) A virtual machine as recited in claim 21,

wherein said second reference is a reference to an array of references, and

wherein each reference in said array of references is a reference to an instance field associated with said Java object.

24. (New) A virtual machine as recited in claim 21,
wherein said internal class representation includes a header of a predetermined size, and
wherein a method table associated with said Java object is allocated immediately after said header.
25. (New) A computer readable media as recited in claim 1, wherein said object is an object which is complaint with Java™ programming language.
26. (New) A method as recited in claim 9, wherein said object is an object which is complaint with Java™ programming language.
27. (New) A method as recited in claim 15, wherein said object is an object which is complaint with Java™ programming language.